

**WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY**  
Control No. (TCN) 08152 with Battelle Chapel Hill Operations for the U.S. Army Environmental Policy Institute

**FEBRUARY 2009 REPORT**

Note to Readers: Pages 1-16 comprise the summary and analysis of this report. Expanded details for some items are in the Appendix beginning on page 17.

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## **Item 1. UNEP Conference Furthers Environmental Governance**

The 25<sup>th</sup> session of the United Nations Environment Programme (UNEP) Governing Council/Global Ministerial Environment Forum (GC-25/GMEF) took place February 16-20, 2009, at the UN Office in Nairobi, Kenya, with over 1000 participants from 147 countries. The meeting adopted 17 decisions on issues such as hazardous substances (including a proposed ban on mercury), biodiversity, special requirements for Africa, environmental management, and the environmental situation in Gaza (see [Appendix](#) for more detail and sources).

### **Military Implications:**

Working documents and decisions from the UNEP meetings should be reviewed for applications of the Army Strategy for the Environment, rationales for increased military collaboration with UNEP and other organizations to improve environmental governance, and military-to-military opportunities to improve environmental security.

### **Sources:**

25<sup>th</sup> session of the UNEP Governing Council/Global Ministerial Environment Forum (documents)

<http://www.unep.org/GC/GC25/working-docs.asp>

25<sup>th</sup> Session of the UNEP Governing Council/Global Ministerial Environment Forum (analysis)

<http://www.iisd.ca/unepgc/25unepgc/>

Historic Treaty to Tackle Toxic Heavy Metal Mercury Gets Green Light

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=562&ArticleID=6090&l=en>

## **Item 2. UN Report on the Role of Natural Resources in Conflict and Peacebuilding**

The report “From Conflict to Peacebuilding – The Role of Natural Resources and the Environment”, co-authored by IISD and UNEP, assesses the linkages among environment, conflict, and peacebuilding. It notes that since 1990 at least 18 violent conflicts have been driven by factors related to natural resources and/or environmental degradation. Over 40% of intra-state wars are linked to the exploitation of natural resources. These situations are twice as likely to return to conflicts or become “re-wars” within the first five years. Unfortunately, fewer than 25% of relevant peace agreements address the environmental or resource aspects. The report analyzes 13 case studies including Afghanistan, Darfur, Sierra Leone, Kosovo, and Gaza.

### **Military Implications:**

The case studies should be reviewed for insights that could be applied to environmental security planning, training, and policy.

### **Sources:**

From Conflict to Peacebuilding – the Role of Natural Resources and the Environment

[http://www.unep.org/publications/search/pub\\_details\\_s.asp?ID=3998](http://www.unep.org/publications/search/pub_details_s.asp?ID=3998)

Natural Resource Management Critical to Peacebuilding

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=562&ArticleID=6091&l=en>

### **Item 3. South Korea Adopts a Green Growth Policy and Influences Next G-20 Meeting**

President Lee Myung-bak stressed “Green Growth” at the Global Korea 2009 forum in Seoul as a way to address both the global financial crises and climate change at the same time. He will be a member of the G-20 management Troika for the April 2009 G-20 meeting in London along with leaders of Brazil and the U.K, and is expected to push the Green Growth strategy.

#### **Military Implications:**

Military-to-military programs in Korea should be reviewed for new opportunities to support the Green Growth initiative.

#### **Sources:**

Global Korea

<http://joongangdaily.joins.com/article/view.asp?aid=2901440>

Lee ambitious about Korea's role in G20 meeting

[http://www.korea.net/news/issues/issueDetailView.asp?board\\_no=20234](http://www.korea.net/news/issues/issueDetailView.asp?board_no=20234)

President Lee drives eco-friendly growth with "Green New Deal" project

[http://dynamic-korea.com/news/view\\_news.php?main=KTD&sub=&uid=200900273650&keyword=](http://dynamic-korea.com/news/view_news.php?main=KTD&sub=&uid=200900273650&keyword=)

### **Item 4. Technological Advances with Environmental Security Implications**

#### **4.1 New Detection and Cleanup Techniques**

##### **4.1.1 Improved Techniques for Water Treatment**

According to an NSF announcement, the Center of Advanced Materials for Purification of Water with Systems at the University of Illinois Urbana-Champaign is developing “sensors with specially designed and synthesized DNA to detect trace amounts of lead, mercury, arsenic and other contaminants” and “chemically activated fibers and granules of carbon for removal of heavy metals and pesticides like atrazine in the presence of natural organic matter that interferes with many existing sensors”.

#### **Military Implications:**

The military should follow the developments originating at this Center as they progress toward suitability for field deployment in discovering and restoring damaged water supplies in the environment.

#### **Source:**

Clean Water for a Crowded, Contaminated World

[http://www.nsf.gov/discoveries/disc\\_summ.jsp?cntn\\_id=112996&govDel=USNSF\\_1](http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=112996&govDel=USNSF_1)

##### **4.1.2 Inverse Fluidization of Aerogels Removes Oil from Water**

Scientists from the Otto H. York Department of Chemical Engineering at the New Jersey Institute of Technology, Newark, have reported a very efficient water decontamination technique in which a floating bed of surface-treated hydrophobic aerogel (Nanogel) granules are fluidized by a downward flow of oil-contaminated water in an inverse fluidization mode. According to an abstract, “Among the advantages of the process is the extremely low energy consumption (low

pressure drop) during oil removal and the large absorption capacity. Oil concentrations of about 2000 mg/L in water could be reduced to less than 10 mg/L by the inverse fluidization process.”

**Military Implications:**

The military should investigate this process for its possible application to practical systems for decontaminating water in a polluted environment.

**Source:**

Removal of Oil from Water by Inverse Fluidization of Aerogels

<http://pubs.acs.org/doi/abs/10.1021/ie800022e>

**4.1.3 Simple New Technique Supplies Chlorine for Water Purification**

John Hays, superintendent of Washington, Iowa's water treatment plant, developed an electrolytic chlorination technique that offers an easy, inexpensive way of creating potable water in primitive circumstances. The method involves passing salt water through an electrolytic device (driven by, say, a 12 v. battery), to produce a combination of ozone, hydrogen peroxide, and chlorine, which can then be used for water purification. The method is being offered commercially by International Water Management Systems of Washington IA

**Military Implications:**

The military should investigate this technology for its possible applicability to producing safe water under difficult environmental conditions and compare its cost and effectiveness with similar systems on the market.

**Sources:**

International Water Management Systems

<http://www.iwmsystems.com/>

Iowan makes tainted water fit to drink

<http://www.desmoinesregister.com/article/20090222/NEWS02/902220344/1001/NEWS>

**4.1.4 Isotope Ratio Evaluates Decontamination Success**

A recent EPA report describes a new method for monitoring the success of biodegradation in decontaminating underground water. The technique, developed at the Univ. of Toronto's Stable Isotope Laboratory, depends on the active microbes' preference in the cleansing process for the carbon-12 isotope over carbon-13. The resulting change in the ratio of these isotopes in the contaminant indicates that the decontamination is proceeding satisfactorily.

**Military Implications:**

The military should investigate this development for its possible application in monitoring the operation of remediation site water purification systems.

**Sources:**

A Guide for Assessing Biodegradation and Source Identification of Organic Ground Water Contaminants using Compound Specific Isotope Analysis (CSIA)

<http://www.epa.gov/ada/pubs/reports/600r08148/600r08148.pdf>

EPA Ground Water and Ecosystems Restoration Research

[www.epa.gov/ada](http://www.epa.gov/ada)

New technique put to use to test clean up of contaminated groundwater

<http://www.physorg.com/news152539505.html>

## 4.2 Increasing Energy Efficiency Technologies

### 4.2.1 Mobile Unit Turns Waste into Energy

The IST Energy Corp. of Waltham, MA has announced its new GEM (Green Energy Machine) mobile waste-to-energy conversion system that can turn two to three tons of post-consumer rubbish – paper, plastic, food, wood and agricultural materials – a day into usable “energy pellets” that can be gasified and used to run a natural gas generator, which in turn can power the unit.

#### **Military Implications:**

The military should investigate this development for usefulness in reducing its environmental foot print by producing energy from waste that might otherwise be destined for uncontrolled burning or a landfill.

#### **Source:**

IST Energy (corporate site)

<http://www.istenergy.com>

New England Firm Says Its New Waste-to-Energy System is a GEM

<http://www.greenerbuildings.com/news/2009/01/01/gem>

### 4.2.2 Carbon Nanotubes Could Replace Expensive Platinum Catalysts in Fuel Cells

Prof. Liming Dai at the University of Dayton (Ohio) and his group have shown that arrays of vertically grown, nitrogen-doped, carbon nanotubes could be used as the catalyst in fuel cells, replacing expensive platinum catalysts now used; it is claimed that they would also be longer lasting than the platinum types. Other work in fuel cell electrodes is underway by Kotaro Sasaki at the Brookhaven National Lab (atom-thick platinum films), at Monash Univ. in Australia (a polymer, PEDOT), and at the Argonne National Lab (nanotube arrays with small quantities of platinum or iron).

#### **Military Implications:**

The military should follow these developments as they progress toward the goal of becoming economically feasible, environment-sparing fuel cell catalysts.

#### **Source:**

Cheaper Fuel Cells. Carbon nanotubes could replace expensive platinum catalysts and help finally make fuel cells economical

<http://www.technologyreview.com/energy/22074/>

### 4.2.3 New Materials Better for Separating Hydrogen from Other Gases

One of the biggest difficulties for the fuel cell economy is efficiently producing pure hydrogen. Mercouri G. Kanatzidis, a chemist at Northwestern University, has developed a new class of honeycomb-like porous materials (a new family of germanium-rich chalcogenides) that are much more effective than current methods at separating hydrogen from complex gas mixtures. The technology is based on the differing behaviors of varieties of gas molecules as they pass through the separation material.

**Military Implications:**

The military should follow this development as it may be applied to more efficient production systems for environment-sparing hydrogen power.

**Sources:**

Mesoporous germanium-rich chalcogenido frameworks with highly polarizable surfaces and relevance to gas separation

<http://www.nature.com/nmat/journal/vaop/ncurrent/full/nmat2381.html> (Requires subscription or individual article purchase.)

Chemists offer new hydrogen purification method

<http://www.physorg.com/news153928167.html>

4.2.4 New Titanium Nanotube Catalyst A Step Forward in CO<sub>2</sub> to Methane Conversion

Craig Grimes and his group at the Materials Research Lab of the Pennsylvania State University have developed a technology, based on catalytic titanium dioxide nanotubes coated with copper and platinum particles, that uses sunlight to convert a mixture of carbon dioxide and water vapor to natural gas at a rate twenty times higher than any previously published results. This is not yet a practical level, but the researchers are working on improvements that they hope would provide at least two orders of magnitude better performance.

**Military Implications:**

The military should follow this line of research as it progresses toward the goal of becoming a practical fuel source.

**Source:**

High-Rate Solar Photocatalytic Conversion of CO<sub>2</sub> and Water Vapor to Hydrocarbon Fuels

<http://pubs.acs.org/doi/abs/10.1021/nl803258p> (Abstract; full text by subscription)

Sun-powered device converts CO<sub>2</sub> into fuel

<http://www.newscientist.com/article/dn16621-sunpowered-device-converts-co2-into-fuel.html>

4.2.5 Study of Cost and Availability of Possible New Solar Cell Materials

A new study from the Energy and Resources Group and the Department of Chemistry at the University of California, Berkeley, and the Lawrence Berkeley National Laboratory (LBNL) investigates the cost and availability of a number of possible solar cell materials. According to a story from the Environmental News Network, “The UC Berkeley study evaluated 23 promising semiconducting materials and discovered that 12 are abundant enough to meet or exceed annual worldwide energy demand. Of those 12, nine have a significant raw material cost reduction over traditional crystalline silicon, the most widely used photovoltaic material in mass production today.”

**Military Implications:**

The military should consult the evaluation paper for ideas on further advancing and accelerating the potential implementation of the most efficient technologies for military purposes.

**Sources:**

Cheaper materials could be key to low-cost solar cells

[http://berkeley.edu/news/media/releases/2009/02/17\\_solar.shtml](http://berkeley.edu/news/media/releases/2009/02/17_solar.shtml)

Cheaper materials could be key to low-cost solar cells  
[http://www.nanotech-now.com/news.cgi?story\\_id=32198](http://www.nanotech-now.com/news.cgi?story_id=32198)

#### 4.2.6 Largest Chinese Car Maker Produces All-electric Model

China's largest independent carmaker, Chery Automobile, has begun producing its first plug-in electric car, the S18, rated at 93 miles per charge, 72 mph, and charging times of 30 minutes/half charge, six hours/full. No general availability date has been announced [See also *All-Electric cars coming from Norway and China with More than Hundred Mile Ranges* in April 2008 and other related items in previous environmental security reports.]

#### **Military Implications:**

The military should assess the technologies employed in this latest non-polluting vehicle for ideas on future developments.

#### **Source:**

China's Chery Auto unveils electric car: company  
<http://www.physorg.com/news154363401.html>

### **Item 5. Updates on Previously Identified Issues**

#### **5.1 Undersea Abandoned Ordnance Presents Increasing Environmental and Health Hazards**

Leaking abandoned ordnance since WWII or from military exercises is contaminating the waters around Puerto Rico's Vieques Island with carcinogenic materials, endangering the marine ecosystem and the health of inhabitants who eat local seafood, noted University of Georgia ecologist James Porter at the Second International Dialogue on Underwater Munitions held February 25-27 in Honolulu, Hawaii. Other previous findings also show dangerously high levels of heavy metals and other toxic chemicals related to military activities in the area. In 2001, Vieques's residents filed a \$100 million damage claim against the US Navy for increased cancer incidence due to military exercises. U.S. Navy efforts to clean up areas of Vieques were so far limited to land and shoreline. Experts note that Vieques Island is one of many marine sites around the world increasingly affected by abandoned ordnance. [See also *CCW Protocol V on Explosive Remnants of War Entered into Force* in November 2006, and other items on this issue in previous environmental security reports.]

#### **Military Implications:**

The U.S. did not ratify the Law of the Sea, and Protocol V on Explosive Remnants of War (with which it recently deposited the instruments of ratification) is not retroactive; nevertheless, it would be wise to continue to explore methods to clean military remnants. Not only is there a moral responsibility to reduce environmental and health hazards one causes, but the polluter pays principle is increasingly being applied and hence, international opinion could evolve over time toward retroactive liabilities.

**Sources:**

Addressing Assessment, Characterization, Management and Communication of Risk in Chemical and Conventional Munitions, Worldwide

<http://underwatermunitions.com/index.php>

Undersea bombs threaten marine life

<http://www.cnn.com/2009/TECH/science/02/26/undersea.munitions.cleanup/>

Carcinogens found in marine life in island of Vieques in Puerto Rico

<http://www.caribbeannetnews.com/news-14429--21-21-.html>

U.S. Joins Four Law of War Treaties

<http://www.state.gov/r/pa/prs/ps/2009/01/115309.htm>

## **5.2 International Satellite Collision Triggers Regulations Review**

The collision between a decommissioned Russian spacecraft and a commercially owned US satellite on February 10, 2009, triggered review of international regulations for operating near-Earth objects. According to some space scientists, the accident may have caused 700 pieces of space debris in an area where other satellites orbit, thus raising the likelihood of other collisions. Experts note that, considering the over 17,000 (and the number is increasing) man-made objects of size over 10 cm that orbit Earth, an advanced ability to monitor objects in orbit, such as a Space Situational Awareness (SSA) system might be needed. The UN Office for Outer Space Affairs called on all Member States and international organizations to help curb space debris by fully implementing the voluntary Space Debris Mitigation Guidelines of the UN Committee on the Peaceful Uses of Outer Space. The issue was also discussed at the recent 46th session of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space and an international response will be presented for consideration in 2010, at the Subcommittee's 47<sup>th</sup> session. The 46<sup>th</sup> meeting also adopted the draft Safety Framework for Nuclear Power Source Applications In Outer Space, to be transmitted for consideration and agreement by the IAEA Commission on Safety Standards during its meeting to be held in Vienna, April 22-24, 2009. [See also *China's ASAT Test Created Serious Long-Range Low-Earth Orbital Pollution* in February 2007, *Outer Space Policy* in November 2008 and other related items in previous environmental security reports.]

**Military implications:**

This accident and property loss offers an opportunity to explore joint research programs to reduce current space debris, increase R&D to collect debris, and improve modeling software to monitor and predict in greater detail NEO trajectories, as well as seek military-to-military cooperation to explore joint research programs to reduce debris and the likelihood of accidents.

**Sources:**

UN Reiterates the Importance of the Implementation of the Space Debris Guidelines to Curtail Space Debris in Future

<http://www.unis.unvienna.org/unis/pressrels/2009/unisos376.html>

Outer Space Scientific and Technical Subcommittee Concludes its 46th Session in Vienna

<http://www.unis.unvienna.org/unis/pressrels/2009/unisos377.html>

Following Collision of Satellites, UN Space Office Calls For Preventive Steps

<http://www.un.org/apps/news/story.asp?NewsID=29908&Cr=outer+space&Cr1=>

When Satellites Collide

[http://www.spacemart.com/reports/It\\_Finally\\_Happened\\_Two\\_Satellites\\_Collide\\_999.html](http://www.spacemart.com/reports/It_Finally_Happened_Two_Satellites_Collide_999.html)

Sat collision highlights growing threat  
<http://news.bbc.co.uk/2/hi/science/nature/7885750.stm?iss>

### **5.3 New Recommendations for Reducing Nuclear Risk**

“Lifting the Nuclear Shadow: Creating the Conditions for Abolishing Nuclear Weapons” is a plan released by the British Foreign Ministry on steps towards elimination of nuclear weapons worldwide.

“Future of the Nuclear Security Environment in 2015” by the U.S. National Academies and the Russian Academy of Sciences presents avenues for cooperation to improve the international nuclear security environment by 2015. [See also *Nuclear Security* in October 2008 and other related items in previous environmental security reports.]

#### **Military Implications:**

These reports should be reviewed as part of the continuous efforts for reducing the risks linked to nuclear safety. The recommendations could be included in plans for assisting in compliance and improving effectiveness of current and future regulations.

#### **Sources:**

Lifting the Nuclear Shadow: Creating the Conditions for Abolishing Nuclear Weapons  
<http://www.fco.gov.uk/resources/en/pdf/pdf1/nuclear-paper>

British Policy Paper Calls for Eliminating Global Nuclear Weapons  
[http://gsn.nti.org/gsn/nw\\_20090204\\_1382.php](http://gsn.nti.org/gsn/nw_20090204_1382.php)

*Future of the Nuclear Security Environment in 2015: Proceedings*  
[http://www.nap.edu/catalog.php?record\\_id=12590](http://www.nap.edu/catalog.php?record_id=12590)

Internationalization of the Nuclear Fuel Cycle: Goals, Strategies, and Challenges  
[http://www.nap.edu/catalog.php?record\\_id=12477](http://www.nap.edu/catalog.php?record_id=12477)

### **5.4 Nordic Countries Alliances for Addressing Arctic Issues**

At a NATO Seminar on Security Prospects in the High North, held in Reykjavik, Iceland, Secretary General Jaap de Hoop Scheffer underlined that changes in the Arctic region will increase the Alliance’s role in the area. The Allied nations have the necessary capabilities and equipment to address potential risks linked to increased activities in the Arctic region, and the Euro-Atlantic Disaster Response Coordination Centre has the necessary expertise for relief and rescue operations. Along the same lines, a 13-point Proposal was presented at the extraordinary meeting of Nordic foreign ministers held in Oslo, February 9, 2009, laying out the framework for the creation of Nordic cooperation on foreign and security issues, including a Scandinavian Defence Union to include Denmark, Finland, Norway, Sweden, and Iceland. Considering the rapid Arctic ice retreat, the report suggests the establishment of a monitoring and early warning system (including a polar orbit satellite system by 2020), as well as a common rescue force (to include both civilian and military personnel), rapidly deployable in case of disastrous events in the Nordic sea areas. The integrated Nordic system and “battlegroup” would be the first such regional initiative. The proposal will be further discussed in April, at the Nordic foreign ministers meeting in Reykjavik. [See also *Arctic Security and Sovereignty Debate Continues* in January 2009 and other similar items in previous environmental security reports.]

**Military Implications:**

[Similar to previous on this issue] Negotiations for clear international regulations concerning the Arctic region are necessary. The potential for new military roles in the region increases for both national security and protection of the ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations for developing adequate strategies, regulations, and enforcement procedures.

**Sources:**

Speech by NATO Secretary General Jaap de Hoop Scheffer on security prospects in the High North  
<http://www.nato.int/docu/speech/2009/s090129a.html>

Nordic Cooperation on Foreign and Security Policy. Proposals presented to the extraordinary meeting of Nordic foreign ministers in Oslo on 9 February 2009  
[http://www.regjeringen.no/upload/UD/Vedlegg/nordic\\_report.pdf](http://www.regjeringen.no/upload/UD/Vedlegg/nordic_report.pdf)

Nordic countries to pool troops and intelligence  
<http://euobserver.com/9/27574/?rk=1>

Nordic military alliance to challenge Russia in Arctic  
<http://www.russiatoday.com/news/news/37071>

**5.5 Energy and Environmental Security Increasingly Addressed Together**

Chinese officials and U.S. Secretary of State Hillary Clinton agreed to join efforts in addressing the world economic crisis and environmental and security issues. The two countries would cooperate on “clean energy” technology that would include such elements as carbon capture and sequestration, and the smart grid.

Some Canadian think tanks related to the oil industry suggest the creation of a North Pacific Energy Security Framework that would include six countries that share geographic proximity and account for 54% of world energy demand: Canada and Russia—two of the world’s top oil and gas producers and exporters; and the US, China, Japan, and South Korea—among the world’s top energy consumers. The pact would address issues related to developing Arctic resources, investment in energy and energy trade, and climate change.

The proposed new U.S. Energy Efficiency Resource Standard (EERS) legislation would require electric and gas utilities to reduce demand by 15% and 10% respectively, by 2020, by increasing energy efficiency. The Obama administration is also considering introducing national rules for regulating greenhouse gas emissions for automobiles, to achieve an average of 35 miles per gallon by 2020. (California’s proposed standard is about 42 mpg.) [See also *European Energy Security Strategies* in January 2009, *North American Environmental Security Action Plan* in June 2008 and other related items in previous environmental security reports.]

**Military Implications:**

In addition to continuously improving its energy efficiency policies, the military should seek cooperation with its counterparts and seek further opportunities to apply the *Army Strategy for the Environment* in energy programs.

**Sources:**

China, U.S. agree to add climate, security topics to talks  
<http://www.chicagotribune.com/news/nationworld/chi-clinton-china-sliderfeb22,0,4463769.story>  
Clinton, Chinese add environmental and security issues to economic talks  
<http://www.latimes.com/news/nationworld/washingtondc/la-fg-clinton-china22-2009feb22,0,2814624.story>

Obama Agrees To Work With Canada On Clean Energy

<http://planetark.org/wen/51741>

The Oil Sands: Energy Security v. Climate Change

<http://www.kciinvesting.com/articles/9852/1/The-Oil-Sands-Energy-Security-v-Climate-Change/Page1.html>

'Energy Efficiency Resource Standard' Would Reduce Energy Costs, Global Warming Pollution, Avoid New Power Plants, Says Alliance

<http://news.prnewswire.com/ViewContent.aspx?ACCT=109&STORY=/www/story/02-04-2009/0004966695&EDATE>

U.S. May Set Greenhouse Gas Standard for Cars

<http://www.washingtonpost.com/wp-dyn/content/article/2009/02/23/AR2009022302575.html?hpid=topnews>

## **5.6 Climate Change**

### **5.6.1 Scientific Evidence and Natural Disasters**

A decade of drought, a record-breaking heat wave, and strong winds created exceptional conditions for the rapid spread of the bushfires in the state of Victoria, Australia. Over 200 people were killed and thousands of homes burned by the worst fires in the country's history. However, the region might expect longer and more extreme dry periods in the future due to climate change. The International Workshop on Drought and Extreme Temperatures organized jointly by the World Meteorological Organization and the China Meteorological Administration in Beijing, February 16-17, 2009, warned that the frequency and intensity of severe drought, heat waves, and wildfires are likely to increase this century. The regions considered most vulnerable to severe drought are: continental U.S. and Mexico, the Mediterranean basin, parts of northern China, southern Africa and Australia, and parts of South America. Severe heat waves are expected to increase everywhere, but especially in the continental western U.S., northern Africa, the Middle East, central Asia, and southern Africa and Australia. The issues will be further addressed at the World Climate Conference-3 to be held August 31-September 4, 2009 in Geneva. It was recommended that a drought index be developed to help the world better cope with increasing droughts and extreme temperatures.

The level of Africa's Lake Victoria, a vital source for the Nile, had dropped 3 meters over the past six years, due to warmer temperatures and reduced precipitation.

"The Humanitarian Costs of Climate Change" report reveals that natural disasters affect an average of some 250 million people yearly; and since 1992 nearly \$2.7 trillion dollars have been spent on international response to environmental disasters. The report estimates that this spending could increase by 32%, considering changes in the frequency of disasters, and 1,600%, factoring in other criteria, such as intensity.

New data from the National Climatic Data Center show that global temperatures have risen 0.22° F since 1990. The organization warns that even lower warming levels in the future will cause serious consequences of water shortage, extreme weather events, and threats to ecosystems and humans.

### **5.6.2 Food and Water Security**

"The Environmental Food Crisis: The environment's role in averting future food crises" report by UNEP warns that 25% of the world's food production might be lost by 2050 due to environmental breakdown. In the meantime, over half of the food produced today is lost, wasted, or discarded as a result of inefficient food chain management. In addition, the share of the

world's cereals used for animal feed is projected to increase from a third today to a half by 2050. With the global population expected to continue increasing, world food prices might rise by 30-50% over the coming decades. The report proposes seven goals for reducing food insecurity, ranging from short-term price issues to long-term global warming measures.

The High-level Meeting on Food Security for All, held from January 26-27, 2009, in Madrid, Spain, issued a statement that calls for a consultative process on options for a Global Partnership for Agriculture Food Security and Nutrition. At a roundtable meeting on disaster, risk reduction, and climate change in Nairobi, held February 20th, Kenya's Prime Minister Raila Odinga underlined that climate change is a threat to food security and could dampen efforts aimed at tackling poverty in Africa unless urgent steps are taken to address it.

Hundreds of millions of South Asians face growing water stress due to over exploitation, climate change, and inadequate cooperation among countries. All three factors are threatening river basins that sustain about half of the region's 1.5 billion people, warns the report "Freshwater Under Threat: South Asia" by UNEP and the Asian Institute of Technology. South Asia is home to 25% of the global population but has access to less than 5% of the world's freshwater resources. The report calls for urgent policy attention and more research into the impact of climate change on water resources, infrastructure, and management practices, as well as improved cooperation among the affected countries and integrated basin management. China declared a drought emergency and earmarked Rmb400m (US\$58.5m) for relief. The agriculture ministry says water shortages are affecting up to 43% of the country's wheat-producing area and around 3.7m people.

A new study published in *Fish and Fisheries* warns climate change threatens the livelihood of millions of people in fishery-dependent nations. The study identifies 33 countries of high vulnerability, 19 of which are already in the UN "least developed" category. The countries listed as most vulnerable are: Malawi, Guinea, Senegal, Uganda, Bangladesh, Cambodia, Pakistan, Yemen, Peru, and Colombia.

"The World's Water 2008-2009 Biennial Report on Fresh Water Resources" states that providing clean water and proper sanitation to the poorest billions is directly related to governance and commitment to the task, not money or lack of available transport and technology. Discussing "Peak Water," Peter Gleick notes that although water is a renewable resource—and therefore we should never completely run out of it—increasing population and agricultural needs might drain the non-renewable aquifers. Some recommendations include improving water-use efficiency; accurate water pricing; updating the Clean Water Act and the Safe Drinking Water Act to include new contaminants, actively enforcing the standards already in place, and strengthening water institutions.

The 10<sup>th</sup> session of the Human Rights Council to be held March 2-27, 2009, in Geneva, will consider a report by the High Commissioner for Human Rights on the relationship between climate change and human rights such as right to safe and adequate water and food, health, and housing. The report was produced in consultation with member States and relevant actors, including IPCC and UNFCCC.

### 5.6.3 Migration

A panel of experts from the EU and U.S. pointed out that without comprehensive analysis of environment-induced human migration—assessing when, where to, where from, and how many people are going to move—there is a danger of focusing on wrong areas, underestimating certain regions' needs while over-allocating resources to others. They also stressed that: climate security and energy security should be addressed jointly; and worse case scenarios should be analyzed

against the tradeoffs that are realistically acceptable to cut emissions and address climate change causes and effects. The session “Climate Security Roundtable: U.S. and EU Research and Policy” was organized by the Environmental Change and Security Program of the Woodrow Wilson Center.

First the Maldives and now the president of Kiribati are calling on the international community to help relocate their populations due to forecasted sea level increases.

#### 5.6.4 Melting Glaciers and Sea Ice

A glitch in satellite sensors caused underestimation of the extent of Arctic sea ice by 500,000 square kilometers (193,000 square miles) the U.S. National Snow and Ice Data Center said. The error was due to a problem called “sensor drift.” The revised data will be available soon.

New evidence shows that the Pyrenees have lost almost 90% of their glacier ice over the past century, and scientists estimate that they might disappear completely within a few decades due to global warming. Other European glaciers seem to have the same fate.

During the International Polar Year (IPY) (covering a two-year period, March 2007-2009), some 160 multi-disciplinary research projects were conducted, involving scientists of more than 60 countries. The findings are summarized in the study *The State of Polar Research* by the UN World Meteorological Organization and the International Council for Science, and a major IPY science conference is planned for Oslo, in June 2010. Although many questions remain, there is consensus that global warming is more intense in the Polar Regions than previously forecasted, and snow and ice are declining in both regions, raising sea levels and changing global ocean and atmospheric circulation, with a wide range of consequences for humans and ecosystems.

#### 5.6.5 Rising Sea Levels

According to a study by the National Centre for Space Studies in France, over the last 15 years the world’s oceans have been rising at 3.4 mm a year, more than twice the average 1.7 mm recorded by tidal gauges over the past 50 years.

A Canadian research team, analyzing how the coastlines around the world would be affected by melting of parts of Antarctica discovered that modifications in the gravitational pull on the ocean will determine water moves that will cause different sea level rises in different parts of the world. An entire West Antarctic Ice Sheet melt might cause the Earth’s rotation axis to shift approximately 500 metes from its present position, moving water from the southern Atlantic and Pacific oceans northward. Hence, while Southern Chile and Argentina might not experience sea-level change, Atlantic and Pacific coasts of Canada and the U.S. could experience as much as 6-7 meters sea level rise, inundating cities such as Vancouver and New York.

Erosion is another important phenomenon changing coastlines. *Geophysical Research Letters* reports that the rate of erosion along a stretch of Alaska’s northeastern coastline has doubled over the past 52 years, increasing from 6.8 meters per year in the period 1955-1979, to 13.6 meters between 2002 and 2007, while from 2007 to 2008 the coastline lost 25 meters. The changes are attributed mostly to effects of climate change, such as stronger storms, loss of sea ice, warmer ocean, and sea level rise.

#### 5.6.6 Health

WHO approved a five-year work plan on climate change and health. The work plan aims to enhance capacity for monitoring and assessment. It will also seek strategies and activities that can protect health, especially that of the most vulnerable; and promote the sharing of knowledge with the following four objectives: advocacy and awareness raising; partnership building with

other UN organizations and sectors; promotion and support for the generation of scientific evidence; and strengthening health systems to contend with climate impacts.

Jointly with the EU, WHO will conduct assessments of health security and crisis management to enhance the adaptive capacity of EU countries to manage health crises. In addition to topics such as chemical safety and disaster preparedness planning and response, country reports include sections on climate change. Assessments are underway in Armenia, Azerbaijan, Belarus, Georgia, Israel, Moldova, and Ukraine.

Climate change will be one of the main topics on the agenda at the Fifth Ministerial Conference on Environment and Health, scheduled for 2010 in Parma, Italy. The agenda includes children's environmental health and climate impacts related to inequality, gender and stakeholder participation, among others. WHO and EU are also expected to propose a European strategy on health and climate change that follows the 2008 World Health Assembly's Resolution 61.19 (call for protecting health from climate change), as well as recommendations that were developed during several European meetings held in 2007-2008 on the topic.

#### 5.6.7 Computer Modeling

A computer model by the Institute of Mechanical Engineers in Britain shows that over the next 40 years, even if CO<sub>2</sub> emissions continue to grow at the current rate (1.9% annual average), global temperatures will still rise 2° C relative to the pre-industrial age. The computer model also predicts that by the end of the first decade of the 22<sup>nd</sup> century, atmospheric CO<sub>2</sub> would be 4 times the pre-industrial level—even with a decreasing rate of emissions, and by 3000 almost all of Greenland's ice would be melted and Atlantic ocean circulation would be fundamentally changed.

#### 5.6.8 Adaptation and Preparedness

The Ecosystems and Livelihoods Adaptation Network (ELAN) is being created as a platform for sharing information globally and to be a resource linking scientists with managers and decision-makers to help some of the most vulnerable ecosystems and societies cope with the impacts of global climate change. It is a collaboration between the International Union for the Conservation of Nature and WWF International.

Although about \$18 billion were pledged by the world's richest countries to help poorer ones adapt to climate change, less than \$1 billion has been disbursed. The Global Environment Facility distributed \$760 million over the past three years, but about 33% of that went to China, India, and Brazil, while the 49 poorest countries received less than \$100 million.

At the Pacific ICT Ministerial Forum, "Connecting the Unconnected," in Nukualofa, Tonga, from 17-20 February 2009, organized by the International Telecommunication Union, 13 ministers from Pacific Island Countries issued a joint communiqué calling for, *inter alia*: greater coordination among partners to minimize overlap and maximize the impact of investments in ICT development projects; the rapid implementation of regional connectivity initiatives; reinforced efforts to build human capacity in ICT; and making full use of ICTs for early warning and response systems to improve disaster preparedness.

#### **Military Implications:**

[Same as previous on similar issues] Increasingly more compelling evidence and warnings on climate change amplify international discourse and increase the emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects. Hence, the military should be doing its part in reducing greenhouse gas emissions and preparing to help mitigate the human-made and natural catastrophes that could ensue.

**Sources:** (see a more expanded list in the [Appendix](#))

Australia Fires A Climate Wake-Up Call: Experts

<http://planetark.org/wen/51548>

The burning bush

[http://www.economist.com/displaystory.cfm?story\\_id=13109772&fsrc=nwl](http://www.economist.com/displaystory.cfm?story_id=13109772&fsrc=nwl)

International Workshop on Drought and Extreme Temperatures (WMO Press Release)

[http://www.wmo.int/pages/mediacentre/press\\_releases/pr\\_837\\_en.html](http://www.wmo.int/pages/mediacentre/press_releases/pr_837_en.html)

Heat waves and extreme drought will increase with climate change, UN agency says

<http://www.un.org/apps/news/story.asp?NewsID=29957>

*The Humanitarian Costs of Climate Change* report

<http://wikis uit.tufts.edu/confluence/display/FIC/The+Humanitarian+Costs+of+Climate+Change>

*The Environmental Food crises: Environment's role in averting future food crises*

[http://www.grida.no/\\_res/site/file/publications/FoodCrisis\\_lores.pdf](http://www.grida.no/_res/site/file/publications/FoodCrisis_lores.pdf)

High Level Meeting on Food Security for All

<http://www.ransa2009.org/en/index.htm>

Freshwater Under Threat: South Asia

[http://www.roap.unep.org/pub/southasia\\_report.pdf](http://www.roap.unep.org/pub/southasia_report.pdf)

Report of the Office of the United Nations High Commissioner for Human Rights on the relationship between climate change and human rights (Advance unedited version)

[http://www2.ohchr.org/english/issues/climatechange/docs/A.HRC.10.61\\_AUV.pdf](http://www2.ohchr.org/english/issues/climatechange/docs/A.HRC.10.61_AUV.pdf)

The World's Water 2008-2009: The Biennial Report on Freshwater Resources (Report Launch)

[http://www.wilsoncenter.org/index.cfm?topic\\_id=1413&fuseaction=topics.event&event\\_id=497575](http://www.wilsoncenter.org/index.cfm?topic_id=1413&fuseaction=topics.event&event_id=497575)

Climate Security Roundtable: U.S. and EU Research and Policy

[http://www.wilsoncenter.org/index.cfm?topic\\_id=1413&fuseaction=topics.event&event\\_id=497578](http://www.wilsoncenter.org/index.cfm?topic_id=1413&fuseaction=topics.event&event_id=497578)

Climate Fears Are Driving 'Ecomigration' Across Globe

<http://www.washingtonpost.com/wp-dyn/content/article/2009/02/22/AR2009022202378.html>

Satellite sensor errors cause data outage

<http://nsidc.org/arcticseaincnews/>

Many glaciers will disappear by middle of century and add to rising sea levels, expert warns

<http://www.guardian.co.uk/environment/2009/jan/19/glacier-rising-sea-levels>

Polar research reveals new evidence of global environmental change

[http://www.ipy.org/index.php?/ipy/detail/state\\_of\\_polar\\_research/](http://www.ipy.org/index.php?/ipy/detail/state_of_polar_research/)

Polar ice caps melting faster

<http://www.timesonline.co.uk/tol/news/environment/article5683655.ece>

Collapse Of Antarctic Ice Sheet Would Likely Put Washington, D.C. Largely Underwater

<http://www.sciencedaily.com/releases/2009/02/090205142132.htm>

Arctic Coastal Erosion Doubles in 50 Years

<http://sciencenow.scienmag.org/cgi/content/full/2009/220/2>

Climate and Health Work Plan

[http://www.who.int/gb/ebwha/pdf\\_files/EB124/B124\\_11-en.pdf](http://www.who.int/gb/ebwha/pdf_files/EB124/B124_11-en.pdf)

Model Sees Severe Climate Change Impact By 2050

<http://planetark.org/wen/51637>

Climate Change and Ecosystem Management

[http://www.iucn.org/about/work/initiatives/climate\\_news/\\_climate\\_change\\_and\\_ecosystem\\_management/](http://www.iucn.org/about/work/initiatives/climate_news/_climate_change_and_ecosystem_management/)

ITU launches new partnerships for ICT development in the Pacific

[http://www.itu.int/newsroom/press\\_releases/2009/05.html](http://www.itu.int/newsroom/press_releases/2009/05.html)

## 5.7 Nanotechnology Safety Issues

Detailed descriptions of the following nanotechnology issues are in the [Appendix](#)

- New EU Committee Report of the present state of nanotech regulation in the EU calls for much more stringent measures. ([more](#))
- EPA to begin enforcing premanufacture notices for carbon nanotubes, beginning March 1, 2009. ([more](#))
- California Department of Toxic Substances Control asks for additional toxicity and monitoring reports for carbon nanotubes. Environment Canada may shortly make a similar request to nanomaterial users. ([more](#))
- “Mapping Study on Regulation and Governance of Nanotechnologies” by EU FramingNano provides an overview of nanotechnology regulations and governance at European and global levels. ([more](#))
- United States-Africa and Caribbean Nanotechnology Initiative Workshop to be held June 21-26, 2009 in Trinidad, Trinidad and Tobago. ([more](#))

### Military Implications:

[Same as previous on this issue] Military personnel concerned with nanotech issues should contribute their views to these activities. Also, relevant military personnel should review the information generated by such activities to improve military and contractor practices, as well as to assist and cooperate with the organizations working on those issues for enriching their studies.

### Sources:

DRAFT REPORT on regulatory aspects of nanomaterials (2008/2208(INI))

Committee on the Environment, Public Health and Food Safety

<http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+COMPARL+PE-418.270+01+DOC+PDF+V0//EN&language=EN>

EPA to Enforce Premanufacture Reviews for Carbon Nanotubes Beginning March 1

<http://www.merid.org/NDN/more.php?id=1728>

California Gives Carbon Nanotube Makers One Year to Provide Toxicity, Other Data

<http://www.merid.org/NDN/more.php?id=1686>

Canada first country to ask companies to report use of nanomaterials

<http://www.standard-freeholder.com/ArticleDisplay.aspx?e=1409797>

Mapping Study on Regulation and Governance of Nanotechnologies

[http://www.innovationsgesellschaft.ch/media/archive2/publikationen/FramingNano\\_MappingStudy.pdf](http://www.innovationsgesellschaft.ch/media/archive2/publikationen/FramingNano_MappingStudy.pdf)

Invitation: US-African and Caribbean Nanotechnology Initiative (USACANI) Workshop.

<http://www.fonai.org/News.html>

## Item 6. Reports Suggested for Review

### 6.1 UNEP Year Book 2009

The UNEP Year Book 2009 offers a view on scientific understanding of global environmental change and foreseeable issues, helping to raise awareness about potentially threatening issues. It outlines some policies and actions that could help mitigate climate change and reduce the human environmental footprint.

**Military Implications:**

As one of the most authoritative reports on environmental issues, it provides indications of UN priorities and eventual possible international regulations.

**Sources:**

UNEP Year Book 2009. New Science and Developments in Our Changing Environment

<http://www.unep.org/geo/yearbook/yb2009/>

**6.2 Suggestions for Addressing Energy and National Security**

The article “Energy Security as National Security: Defining Problems Ahead of Solutions” analyzes the link between energy and national security looking at military and domestic vulnerabilities and economic issues, and suggesting some strategies. The article warns about the danger that associating energy issues with national security to the point of using “military power or the language of security diplomacy” might have negative effects on energy security itself. The suggestions include: improving systemic resiliency of critical infrastructures; reducing energy price volatility by maintaining a climate of non-violence and adequate investment in energy sources; and sharing security information and intelligence cooperation for increasing transparency. The article is part of the February 2009 issue of the *Journal of Energy Security*, a good source of information and analysis in this area.

**Military Implications:**

The *Journal of Energy Security* is a good resource for geopolitical analysis, offering an authoritative international view on issues related to environmental and energy security.

**Source:**

Energy Security as National Security: Defining Problems Ahead of Solutions

[http://www.ensec.org/index.php?option=com\\_content&view=article&id=183:energy-security-as-national-security-defining-problems-ahead-of-solutions1&catid=92:issuecontent&Itemid=341](http://www.ensec.org/index.php?option=com_content&view=article&id=183:energy-security-as-national-security-defining-problems-ahead-of-solutions1&catid=92:issuecontent&Itemid=341)

## APPENDIX

### Reference Details

This Appendix contains expanded background information on some items.

#### **Item 1. UNEP Conference Furthers Environmental Governance**

The 25<sup>th</sup> session of the United Nations Environment Programme (UNEP) Governing Council/Global Ministerial Environment Forum (GC-25/GMEF) took place February 16-20, 2009, at the UN Office in Nairobi, Kenya, with over 1000 participants from 147 countries. The meeting adopted 17 decisions on issues such as hazardous substances, biodiversity, support to Africa, environmental management, and the environmental situation in Gaza.

##### 1.1 Strengthening International Environmental Governance

A ministerial consultative process on international environmental governance and global environmental assessment was proposed, and it was decided that UNEP will support governments and stakeholders to improve the scientific basis of their own environmental assessment, management, and effective policy implementation. An “assessment of the assessments” will be submitted to the UNGA 64<sup>th</sup> session later this year, when universal membership of the Governing Council and a resolution for a more efficient international environmental governance framework will be discussed. UNEP should provide early warning, assessment, and monitoring, provide environmental information supporting policy and decision making, improve implementation and enforcement of MEAs, and address synergies, and support the implementation of the Bali Strategic Plan. The Fourth Programme for Development and Periodic Review of Environmental Law was adopted as a broad strategy for activities related to environmental law for the decade beginning in 2010, with a mid-term review of the implementation and effectiveness of the Programme no later than GC-28 in 2015 and report to GC-30 in 2019. The Secretariat should support the work of drafting guidelines for the development of national legislation regarding, *inter alia*, access to information and public participation, and liability and redress concerning activities dangerous to the environment. It was also agreed to strengthen the policy relevance of the Global Environment Outlook reports.

##### 1.2 Legally Binding Regulation on Mercury to be Drafted by 2013

Agreement was reached for the elaboration of a legally binding instrument on mercury, which could include both binding and voluntary approaches and actions to reduce risks to human health and the environment. It would cover demand, supply, trade, waste, and emissions, as well as finding alternatives. An intergovernmental negotiating committee should be convened in 2010 with the goal of completing its work by 2013, for the GC-27. [EU legislation banning mercury exports will come into effect in 2011.]

##### 1.3 Assessment for Cadmium and Lead, and Waste Management

The Governing Council agreed on further assessment of potential health and environmental hazards of lead and cadmium, and that the mandate of the intergovernmental negotiating committee could be supplemented regarding these and/or potential hazardous chemicals. As for

waste management, it was decided that UNEP is to provide further assistance to developing countries for implementing an integrated waste management approach, with a progress report to be presented at the GC-26.

#### 1.4 Assessment of the environmental situation in the Gaza strip

Expressing concern about the environmental impacts and implications of the conflict in the Gaza Strip, it was decided that a mission of environmental experts be deployed to Gaza to assess the natural and environmental situation, allocate adequate resources and assistance, request UNEP to participate in the Cairo Conference on the Reconstruction of Gaza, and submit a follow-up report on the findings to the GC/GMEF 11<sup>th</sup> Special Session in 2010.

#### **Sources:**

25<sup>th</sup> session of the UNEP Governing Council/Global Ministerial Environment Forum (documents)

<http://www.unep.org/GC/GC25/working-docs.asp>

25<sup>th</sup> Session of the UNEP Governing Council/Global Ministerial Environment Forum (analysis)

<http://www.iisd.ca/unepgc/25unepgc/>

Historic Treaty to Tackle Toxic Heavy Metal Mercury Gets Green Light

<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=562&ArticleID=6090&l=en>

Ministers agree to launch negotiations on tackling toxic mercury

[http://news.xinhuanet.com/english/2009-02/20/content\\_10859278.htm](http://news.xinhuanet.com/english/2009-02/20/content_10859278.htm)

The UNEP will hold a meeting on Biodiversity loss later this year.

<http://www.unep.org/GC/GC25/index.asp>

Ministers agree to launch negotiations on tackling toxic mercury

[http://news.xinhuanet.com/english/2009-02/20/content\\_10859278.htm](http://news.xinhuanet.com/english/2009-02/20/content_10859278.htm)

## **5.6 Climate Change**

#### **Sources:** (a more expanded list)

Why Global Warming May Be Fueling Australia's Fires

<http://www.time.com/time/health/article/0,8599,1878220,00.html>

Australia Fires A Climate Wake-Up Call: Experts

<http://planetark.org/wen/51548>

Hot and dry Australia sees wildfire danger rise

[http://www.boston.com/news/world/canada/articles/2009/02/10/hot\\_and\\_dry\\_australia\\_sees\\_wildfire\\_danger\\_rise/](http://www.boston.com/news/world/canada/articles/2009/02/10/hot_and_dry_australia_sees_wildfire_danger_rise/)

The burning bush

[http://www.economist.com/displaystory.cfm?story\\_id=13109772&fsrc=nwl](http://www.economist.com/displaystory.cfm?story_id=13109772&fsrc=nwl)

International Workshop on Drought and Extreme Temperatures (WMO Press Release)

[http://www.wmo.int/pages/mediacentre/press\\_releases/pr\\_837\\_en.html](http://www.wmo.int/pages/mediacentre/press_releases/pr_837_en.html)

Experts recommend ways of coping with increasing droughts

[http://www.cma.gov.cn/en/news/200902/t20090223\\_27488.html](http://www.cma.gov.cn/en/news/200902/t20090223_27488.html)

Heat waves and extreme drought will increase with climate change, UN agency says

<http://www.un.org/apps/news/story.asp?NewsID=29957>

Damage from warming may arise sooner than expected  
[http://www.denverpost.com/nationworld/ci\\_11770162](http://www.denverpost.com/nationworld/ci_11770162)

*The Humanitarian Costs of Climate Change* report  
<http://wikis uit.tufts.edu/confluence/display/FIC/The+Humanitarian+Costs+of+Climate+Change>

GLOBAL: Humanitarian costs of climate change unpredictable  
<http://www.irinnews.org/Report.aspx?ReportId=83030>

Expert predicts dire scenarios of climate change: mass migrations and war  
<http://green.sympatico.msn.ca/canadianpressarticle.aspx?cp-documentid=928703>

*The Environmental Food crises: Environment's role in averting future food crises*  
[http://www.grida.no/\\_res/site/file/publications/FoodCrisis\\_lores.pdf](http://www.grida.no/_res/site/file/publications/FoodCrisis_lores.pdf)

Green Revolution with a Capital G is Needed to Feed the World  
<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=562&ArticleID=6084&l=en>  
Green revolution' can ensure enough food for entire world – UN environment agency  
<http://www.un.org/apps/news/story.asp?NewsID=29930&Cr=food+crisis&Cr1>

High Level Meeting on Food Security for All  
<http://www.ransa2009.org/en/index.htm>

Climate change a threat to food security says PM  
<http://www.kbc.co.ke/story.asp?ID=55693>

Freshwater Under Threat: South Asia  
[http://www.roap.unep.org/pub/southasia\\_report.pdf](http://www.roap.unep.org/pub/southasia_report.pdf)

China's dry patch  
[http://www.economist.com/agenda/displaystory.cfm?story\\_id=13088978](http://www.economist.com/agenda/displaystory.cfm?story_id=13088978)

Hundreds of Millions of South Asians Face Increasing Water Stress  
<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=562&ArticleID=6068&l=en&t=long>

Climate Change: Fishery-dependent nations to be hit hard  
[http://africascienccenews.org/asns/index.php?option=com\\_content&task=view&id=989&Itemid=1](http://africascienccenews.org/asns/index.php?option=com_content&task=view&id=989&Itemid=1)

Report of the Office of the United Nations High Commissioner for Human Rights on the relationship between climate change and human rights (Advance unedited version)  
[http://www2.ohchr.org/english/issues/climatechange/docs/A.HRC.10.61\\_AUV.pdf](http://www2.ohchr.org/english/issues/climatechange/docs/A.HRC.10.61_AUV.pdf)

The World's Water 2008-2009: The Biennial Report on Freshwater Resources (Report Launch)  
[http://www.wilsoncenter.org/index.cfm?topic\\_id=1413&fuseaction=topics.event&event\\_id=497575](http://www.wilsoncenter.org/index.cfm?topic_id=1413&fuseaction=topics.event&event_id=497575)

Yet Another 'Footprint' to Worry About: Water  
[http://online.wsj.com/article/SB123483638138996305.html?mod=dist\\_smartbrief](http://online.wsj.com/article/SB123483638138996305.html?mod=dist_smartbrief)

Update 2009: An Integrated Approach to Energy, Food and Water Security  
[http://www.weforum.org/en/knowledge/Events/2009/AnnualMeeting/KN\\_SESS\\_SUMM\\_26731?url=en/knowledge/Events/2009/AnnualMeeting/KN\\_SESS\\_SUMM\\_26731%22](http://www.weforum.org/en/knowledge/Events/2009/AnnualMeeting/KN_SESS_SUMM_26731?url=en/knowledge/Events/2009/AnnualMeeting/KN_SESS_SUMM_26731%22)

Climate Security Roundtable: U.S. and EU Research and Policy  
[http://www.wilsoncenter.org/index.cfm?topic\\_id=1413&fuseaction=topics.event&event\\_id=497578](http://www.wilsoncenter.org/index.cfm?topic_id=1413&fuseaction=topics.event&event_id=497578)

Climate Fears Are Driving 'Ecomigration' Across Globe  
<http://www.washingtonpost.com/wp-dyn/content/article/2009/02/22/AR2009022202378.html>

NZ seen as climate refuge – paper  
<http://www.odt.co.nz/news/national/44791/nz-seen-climate-refuge-paper>

Expert predicts dire scenarios of climate change: mass migrations and war  
<http://green.sympatico.msn.ca/canadianpressarticle.aspx?cp-documentid=928703>

Satellite sensor errors cause data outage

<http://nsidc.org/arcticseainews/>

Sea Ice Index: Most recent daily sea ice conditions

[http://nsidc.org/data/seacie\\_index/daily.html](http://nsidc.org/data/seacie_index/daily.html)

Arctic Sea Ice Underestimated for Weeks Due to Faulty Sensor

<http://www.bloomberg.com/apps/news?pid=20601110&sid=aIe9swvOqwIY>

Climate change lays waste to Spain's glaciers

<http://www.guardian.co.uk/environment/2009/feb/23/spain-glaciers-climate-change>

Many glaciers will disappear by middle of century and add to rising sea levels, expert warns

<http://www.guardian.co.uk/environment/2009/jan/19/glacier-rising-sea-levels>

Polar research reveals new evidence of global environmental change

[http://www.ipy.org/index.php?/ipy/detail/state\\_of\\_polar\\_research/](http://www.ipy.org/index.php?/ipy/detail/state_of_polar_research/)

International Polar Year: In from the Cold

<http://www.nature.com/news/2009/090225/full/4571072a.html>

Greenland, Antarctica Glaciers Speeding Faster Toward the Sea

<http://www.bloomberg.com/apps/news?pid=20601085&sid=aTg9EF2NtBCg&refer=europe>

Evidence of rapid climate change in polar regions

<http://www.news.com.au/couriermail/story/0,23739,25114040-954,00.html>

Polar ice caps melting faster

<http://www.timesonline.co.uk/tol/news/environment/article5683655.ece>

Collapse Of Antarctic Ice Sheet Would Likely Put Washington, D.C. Largely Underwater

<http://www.sciencedaily.com/releases/2009/02/090205142132.htm>

Sea levels would rise unevenly as ice sheet melts, study says

<http://www.theglobeandmail.com/servlet/story/RTGAM.20090205.wsealevel0205/BNStory/Science/home>

Arctic Coastal Erosion Doubles in 50 Years

<http://sciencenow.sciencemag.org/cgi/content/full/2009/220/2>

Climate and Health Work Plan:

[http://www.who.int/gb/ebwha/pdf\\_files/EB124/B124\\_11-en.pdf](http://www.who.int/gb/ebwha/pdf_files/EB124/B124_11-en.pdf)

Climate change preparedness as part of the assessment of health security and crisis management capacity

[http://www.euro.who.int/globalchange/country/20090212\\_1](http://www.euro.who.int/globalchange/country/20090212_1)

Global change and health at the 2010 Fifth Ministerial Conference on Environment and Health

[http://www.euro.who.int/globalchange/country/20090112\\_1](http://www.euro.who.int/globalchange/country/20090112_1)

WHO/Europe to Propose a European Strategy on Health and Climate Change at 2010 Fifth Ministerial Conference on Environment and Health

<http://www.climate-l.org/2009/02/whoeurope-to-propose-a-european-strategy-on-health-and-climate-change-at-2010-fifth-ministerial-conf.html>

Model Sees Severe Climate Change Impact By 2050

<http://planetark.org/wen/51637>

Climate Change and Ecosystem Management

[http://www.iucn.org/about/work/initiatives/climate\\_news/\\_climate\\_change\\_and\\_ecosystem\\_management/](http://www.iucn.org/about/work/initiatives/climate_news/_climate_change_and_ecosystem_management/)

New Global Climate Adaptation Network in the Works

<http://www.ens-newswire.com/ens/feb2009/2009-02-05-01.asp>

Rich nations failing to meet climate aid pledges

<http://www.guardian.co.uk/environment/2009/feb/20/climate-funds-developing-nations>

Pacific ICT Ministerial Forum: "Connecting the Unconnected"

<http://www.itu.int/ITU-D/asp/CMS/Events/2009/PacMinForum/PacMinForum.asp>

ITU launches new partnerships for ICT development in the Pacific

[http://www.itu.int/newsroom/press\\_releases/2009/05.html](http://www.itu.int/newsroom/press_releases/2009/05.html)

## **5.7 Nanotechnology Safety Issues**

### **5.7.1 New EU Committee Report Very Critical of Nanotech Regulation**

Nanoforum reported that the European Parliament is currently discussing its Committee on the Environment, Public Health and Food Safety's draft report on regulatory aspects of nanomaterials. The report is very critical of the present state of nanotech regulation in the EU and calls for much more stringent measures.

#### **Military Implications:**

The military should note the recommendations in the report and be prepared for tighter controls in the EU on the use of nanomaterials.

#### **Sources:**

Nanoforum Newsletter No. 39, February 2009

<http://www.nanoforum.org/nf06~modul~loadin~folder~8074~sent~~step~~.html?> (free registration required)

DRAFT REPORT on regulatory aspects of nanomaterials (2008/2208(INI))

Committee on the Environment, Public Health and Food Safety

<http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+COMPARL+PE-418.270+01+DOC+PDF+V0//EN&language=EN>

### **5.7.2 EPA to Require Company Nanotube Use or Import Notices**

The U.S. Environmental Protection Agency (EPA) Office of Enforcement and Compliance Assurance will begin enforcing a requirement that companies file premanufacture notices for manufacturing or importing carbon nanotubes, beginning March 1, 2009.

#### **Military Implications:**

The military should ensure that it and its contractors are prepared to comply with similar current or future requirements in other jurisdictions where it or its contractors operate.

#### **Source:**

EPA to Enforce Premanufacture Reviews for Carbon Nanotubes Beginning March 1

<http://www.merid.org/NDN/more.php?id=1728>

### 5.7.3 California Requests Nanotube Safety Data

The California Department of Toxic Substances Control (DTSC) has asked more than two dozen manufacturers and importers of carbon nanotubes to provide toxicity, monitoring, and safeguards data on those products. There is also a report that Environment Canada may shortly make a similar request to nanomaterial users.

#### **Military Implications:**

The military should investigate to see if it can obtain access to the data obtained from these requests to use the information in nanomaterials risk assessment.

#### **Sources:**

California Gives Carbon Nanotube Makers One Year to Provide Toxicity, Other Data

<http://www.merid.org/NDN/more.php?id=1686> (abstract)

Canada first country to ask companies to report use of nanomaterials

<http://www.standard-freeholder.com/ArticleDisplay.aspx?e=1409797>

### 5.7.4 New EU Study on Regulation and Governance of Nanotechnologies

“Mapping Study on Regulation and Governance of Nanotechnologies” published by the EU project FramingNano provides a comprehensive overview of nanotechnology regulations and governance at European and global levels, as well as identifying relevant stakeholders for further negotiations of a Governance Plan for responsible development of nanotechnologies.

#### **Military Implications:**

Relevant military personnel might consider the report as a “one-stop” shop for European nanotech-related regulations, and also as an indication of what might become global regulations at some point.

#### **Sources:**

Mapping Study on Regulation and Governance of Nanotechnologies

[http://www.innovationsgesellschaft.ch/media/archive2/publikationen/FramingNano\\_MappingStudy.pdf](http://www.innovationsgesellschaft.ch/media/archive2/publikationen/FramingNano_MappingStudy.pdf)

FramingNano Mapping Study on Nanotechnologies Regulation and Governance Released

<http://www.innovationsgesellschaft.ch/index.php?section=news&cmd=details&newsid=157&teaserId>

### 5.7.5 US/Africa/Caribbean Nanotech Conference to Be Held

The United States-Africa and Caribbean Nanotechnology Initiative (USACANI) Workshop will be held from June 21-26, 2009 in Trinidad, Trinidad and Tobago. According to an announcement in *Meridian Nanotechnology & Development News*, “The purpose of the conference is to bring together nanoscience and nanotechnology leaders to discuss issues critical to the United States, Africa, and the Caribbean.”

#### **Military Implications:**

Relevant military personnel should consider following the outcomes of the workshop as an indication on how nanotech is developed in the other regions and for eventual implications relevant to security and preventive health.

#### **Source:**

Invitation: US-African and Caribbean Nanotechnology Initiative (USACANI) Workshop.

<http://www.fonai.org/News.html>